201. The processor of Claim 200, wherein the effect is to reduce the noise portion.

REMARKS

Claims 41-66 were pending. By way of the instant preliminary amendment, the Applicants amended Claims 41-66 and added new claims 67-201. Claims 41-201 remain pending for consideration.

NOTICE OF LITIGATION IN PARENT

The pending claims have been amended and several new claims added in view of a recent decision of the U.S. Court of Appeals for the Federal Circuit in Masimo v. Mallinckrodt, No. 01-1038, slip op. (Fed. Cir. Aug. 8, 2001) (nonprecedential). No new matter has been introduced. The parent patent, U.S. Patent No. 6,036,642 (the "'642 patent"), is part of litigation between Masimo Corp., the assignee of the '642 patent, and Mallinckrodt Inc. and Nellcor Puritan Bennett, Inc. A copy of relevant judicial decisions regarding the '642 patent are provided in an IDS filed separately. In this litigation, the District Court for the Central District of California and the Federal Circuit construed the terms "adaptive filter" and "adaptive signal processor" in Claims 16 and 28 of the '642 patent to mean an "adaptive noise canceler."

Nothing requested in this application is inconsistent with the findings of the District Court or the Federal Circuit as explained further below. Applicants now present several claims that are directed to different components and subcomponents of the present disclosure. None of the independent claims are directed to the adaptive noise canceler (30, 27). The new claims are directed to different features, components and subcomponents disclosed in the application than addressed by the Federal Circuit, and thus, are in no way inconsistent with the Federal Circuit decision.

The claims have been amended and the new claims have been presented to clearly claim various disclosed features, components, functions, and subcomponents other than the adaptive noise canceler (27,30). For example, the amended and new claims address various features and subcomponents, such as the predetermined algorithm that executes in the internal processor (32). Use of a least squares algorithm is separately claimed. A processor that executes an adaptive algorithm as a component to produce an effect on the intensity signals, which are then used to calculate oxygen saturation is separately claimed.

Several other claims recite specific functions of the microprocessor (420) and the internal processor (32), such as using a least squares algorithm to have an effect on the intensity signals. Other specific features, functions, components and subcomponents are also claimed, and claims of varying scope are presented.

As to the meaning of the term adaptive algorithm and adaptive system, these are intended to have their ordinary meaning, which is any signal processing algorithm or system that monitors its own performance and in response, adjusts the system parameters by closed loop action to improve performance. The patent application discloses multiple adaptive algorithms such as the least squares, the least mean squares, and the least squares lattice.

The new Claims are fully supported by the written description. First, it should be noted that because "a specification describes only one embodiment does not require that each claim be limited to that one embodiment." SRI Int'l v. Matsushita Elec. Corp., 775 F.2d 1107, 1121 n.14 (Fed. Cir. 1985). Moreover, Applicants are not required to claim an entire process or device. "A claim may cover an invention embracing the entire process, machine, manufacture, or composition of matter which is described in the specification, or it may cover such sub-processes or such sub-combinations of the invention as are new, useful and patentable." Reiffin v. Microsoft Corp., 214 F.3d 1342, 1347 (Fed. Cir. 2000) (Newman concurring), citing Lipscomb, III, 3 Lipscomb's Walker on Patents 290-91 (1985). Most of the current claims are directed to sub-processes or particular features or functions of the system. They independent claims are not directed to the noise reference signal, the reference processor or the noise canceler.

In addition, Applicants disclosed multiple adaptive algorithms in the present application, such as a least squares algorithm, a least mean squares algorithm, and a least squares lattice. The present application also discloses use of an error signal, converging the predetermined algorithm through an error signal, optimizing the output signal (which is the result of the operation of the predetermined algorithm), adjusting the processing based on an output, and the other various specifically claimed attributes of the internal processor and microprocessor.

The predetermined, least squares, least mean squares, and least squares lattice algorithms are described for the internal processor (32) or microprocessor (420). See Col. 11, lines 10-12 and Col. 18, lines 30-31. The internal processor (32) is a subcomponent (or

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a routine). For example, the algorithms may also be a routine that executes in the microprocessor (420) depicted in Figure 10. Thus, the term adaptive algorithm and predetermined algorithm are supported in the text of the present specification (e.g., least squares, least mean squares, least squares lattice). The internal processor (32) and the microprocessor (420) include algorithms or routines as subcomponents that effect the intensity signals.

Applicants have also carefully reviewed the prior art. None of the prior art discloses or suggests the claimed combinations. Along those lines, the predetermined algorithms disclosed in the present application are closed loop. Therefore, applicants are making clear in the claims and discussion above, that the claimed adaptive algorithms are closed loop algorithms. These algorithms are performance-improving algorithms. The use of an error signal is also set out explicitly in several claims, as is adjusting the processing based on an output.

REQUEST FOR INTERVIEW

Pursuant to M.P.E.P. § 713.01, in order to expedite prosecution of this application and based on the nature of the current application claiming priority to the '642 patent, the claims of which, as discussed above, were construed by the Federal Circuit, the Applicants' undersigned attorney of record hereby formally requests an interview with the Examiner as soon as the Examiner has considered the claims presented herein and the arguments presented above. Applicants' attorney can be reached at (949) 760-0404 or at the number listed below.

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CONCLUSION

Applicants have attempted to address any possible issues in order to expedite this application to allowance. As discussed above, the Examiner is respectfully requested to call the Applicants' undersigned attorney of record to schedule an interview at the Examiner's soonest convenience.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: November 13, 2001

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Version With Markings to Show Changes Made

Insertions appear as underlined text, for example, insertions, while deletions appear as strikethrough text, for example, ~~deletions~~.

41. (Amended) A pulse oximeter comprising:

at least first and second light emitting devices;

at least one light detector configured to receive light attenuated by transmission through a ~~living~~ body tissue with ~~arterial~~ pulsing blood, the at least one light detector acquiring a first signal based on the first light emitting device comprising a first desired signal portion and a first undesired signal portion and a second signal based on the second light emitting device comprising a second desired signal portion and a second undesired signal portion; and

a closed loop ~~an~~ adaptive system responsive to said first and second signals to provide at least first and second output signals for use in calculating oxygen saturation of said blood; ~~and~~

~~a processor responsive to the first and second output signals to oxygen saturation of said arterial blood~~.

42. (Amended) The pulse oximeter of Claim 41, wherein the adaptive system executes~~uses~~ a least squares algorithm.

43. (Amended) The pulse oximeter of Claim 41~~42~~, wherein the adaptive system executes ~~comprises~~ an adaptive algorithm~~noise canceler~~.

44. (Amended) The pulse oximeter of Claim 42~~43~~, wherein the adaptive system executes ~~uses~~ a least squares lattice.

45. (Amended) The pulse oximeter of Claim 41, further comprising a display coupled to the adaptive system~~to display the oxygen saturation~~.

46. (Amended) A pulse oximeter comprising:

at least first and second light emitting devices;

at least one light detector configured to receive light attenuated by transmission through ~~a living~~ body tissue with ~~arterial~~ pulsing blood, the at least one light detector generating a first signal based on light transmitted from the first light emitting device and a second signal based on light transmitted from the second light emitting device; and

a processor that effects ~~filter responsive to~~ signals representing the first and second signals to provide at least one output signal, ~~first and second filtered output signals,~~ wherein the processor adjusts itself ~~filter monitors its own output performance and adjusts its own transfer function~~ to optimize the at least one output signal for use in calculating ~~its filter performance; and~~

~~a processor responsive to the first and the second filtered output signals to calculate~~ oxygen saturation.

47. (Amended) The pulse oximeter of Claim 46, wherein the ~~filter uses~~ optimum corresponds to execution of a least squares algorithm to convergence by said processor~~to adjust its transfer function~~.

48. (Amended) The pulse oximeter of Claim 47, wherein the least squares algorithm is a component of ~~filter is~~ an adaptive noise canceler.

49. (Amended) The pulse oximeter of Claim 47~~48~~, wherein the least squares algorithm comprises ~~filter is~~ a least squares lattice.

50. (Amended) The pulse oximeter of Claim 47~~46~~, wherein the least squares algorithm comprises ~~filter uses~~ a least ~~means~~ mean squares algorithm.

51. (Amended) The pulse oximeter of Claim 46, further comprising a display coupled to the processor~~to display the oxygen saturation~~.

52. (Amended) A method of calculating blood oxygen saturation comprising ~~the steps of~~:

transmitting light of at least first and second wavelengths through body tissue carrying pulsing blood to a light-sensitive detector to generate first and second intensity signals;

digitizing the first and second intensity signals; and

processing ~~filtering~~ the first and the second digitized intensity signals to provide first and second processed ~~filtered~~ output signals, wherein the processing ~~filtering~~ comprises monitoring ~~the performance of the filtering at~~ an output of the processing ~~by closed-loop action~~, and in response, adjusting ~~a filtering transfer function~~ the processing to optimize at least one of said first or second processed ~~filtered~~ output signals; and

calculating oxygen saturation based upon said first and second processed ~~filtered~~ output signals.

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53. (Amended) The method of Claim 52, wherein the optimum corresponds to executing ~~filtering uses~~ a least squares algorithm to convergence. ~~adjust the transfer function.~~

54. (Amended) The method of Claim 52, wherein the optimum corresponds to executing an error reducing algorithm to convergence. ~~filtering uses a least means squares algorithm to adjust the transfer function.~~

55. (Amended) The method of Claim 52, wherein the optimum corresponds to executing ~~filtering uses~~ a least squares lattice.

56. (Amended) The method of Claim 55~~2~~, wherein the least squares lattice is a component of ~~filtering uses~~ an adaptive noise canceler.

57. (Amended) The method of Claim 52, further comprising displaying the oxygen saturation.

58. (Amended) A pulse oximeter comprising:

~~a light emitter adapted to emit light of at least first and second wavelengths;~~

at least one light detector configured to receive light of at least first and second wavelengths attenuated by transmission through a body ~~living~~ tissue with ~~arterial~~ pulsing blood, the at least one light detector generating ~~acquiring~~ a first signal based on light of the first wavelength and a second signal based on light of the second wavelength;

an analog to digital converter that digitizes the first and the second signals to produce digitized first and second signals; and

a processor that employs an adaptive algorithm ~~system responsive to the first and the second digitized signals~~ to effect the ~~produce adaptively processed filtered~~ digitized first and second signals for use in calculating ~~; and~~

~~a processor responsive to the adaptively filtered first and second signals to calculate~~ oxygen saturation.

59. (Amended) The pulse oximeter of Claim 58, wherein the adaptive algorithm comprises ~~system uses~~ a least squares algorithm.

60. (Amended) The pulse oximeter of Claim 58, wherein the adaptive algorithm comprises ~~system is configured as~~ a least squares lattice.

61. (Amended) The pulse oximeter of Claim 60~~58~~, wherein the adaptive algorithm is a component of ~~system is configured as~~ an adaptive noise canceler.

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62. (Amended) The pulse oximeter of Claim 58, further comprising a display ~~to display the oxygen saturation~~.

63. (Amended) A pulse oximeter comprising:

~~a light emitter adapted to emit light of at least first and second wavelengths;~~

at least one light detector configured to receive light of at least first and second wavelengths attenuated by transmission through a ~~living~~ body tissue with ~~arterial~~ pulsing blood, the at least one light detector ~~acquiring~~ generating a first signal based on light of the first wavelength and a second signal based on light of the second wavelength;

an analog to digital converter that digitizes the first and the second signals to produce ~~digitized~~ first and second digitized signals; and

a ~~filter responsive to~~ microprocessor that has a routine that executes a least squares algorithm to effect the first and the second digitized signals to ~~filter the first and the second digitized signals, to~~ produce first and second output signals, the first and second output signals for use in calculating oxygen saturation; ~~and~~

~~a processor responsive to the filtered first and second signals to calculate oxygen saturation during the presence of patient motion~~.

64. (Amended) The pulse oximeter of Claim 63, wherein the ~~filter uses a~~ effect from the least squares algorithm is to optimize at least one of the first and second output signals.

65. (Amended) The pulse oximeter of Claim 63, wherein the least squares algorithm comprises ~~filter is configured as~~ a least squares lattice.

66. (Amended) The pulse oximeter of Claim 6~~6~~3, wherein the least squares algorithm is a component of ~~filter is configured as~~ an adaptive noise canceler.

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